

## Sharp estimates for integral means for three classes of domains

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### Abstract

In this paper, the following sharp estimate is proved:  $\int_0^{2\pi} |F'(e^{i\theta})|^p d\theta \leq \sqrt{\pi} 2^{1+p} \Gamma(1/2+p/2) / \Gamma(1+p/2)$ ,  $p > -1$ , where  $F$  is the conformal mapping of the domain  $D = \{\zeta: |\zeta| > 1\}$  onto the exterior of a convex curve, with  $F'(\infty) = 1$ . For  $p = 1$ , this result is due to Pólya and Shiffer. We also obtain several generalizations of this estimate under other geometric assumptions about the structure of the domain  $F(D)$ .

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### Keywords

analytic univalent function, conformal mapping, estimates for integral means, Euler beta function, harmonic function, Joukowski function